

HHIP 6060-0322

HHIP CPMT C6 Carbide Inserts User Manual

Model: 6060-0322

Introduction	Product Overview	Setup & Installation	Operating Instructions Warranty & Support	Maintenance
	Troubleshooting	Specifications		

1. INTRODUCTION

This manual provides essential information for the proper use, installation, and maintenance of HHIP CPMT C6 Carbide Inserts. These inserts are designed for precision turning and finishing operations in various industrial applications. Key features of the CPMT C6 Carbide Inserts include:

- 80° diamond shape with chip breaker.
- 11° relief angle for effective cutting.
- Suitable for both turning and finishing applications.
- ISO insert number: CPMT060204.

2. PRODUCT OVERVIEW

The HHIP CPMT C6 Carbide Insert is a precision cutting tool designed for optimal performance in machining operations. Its unique geometry and carbide material ensure durability and efficiency.



Figure 2.1: HHIP CPMT C6 Carbide Insert. This image shows the actual product, a dark grey, square-shaped carbide insert with a central hole and an 80-degree diamond shape.

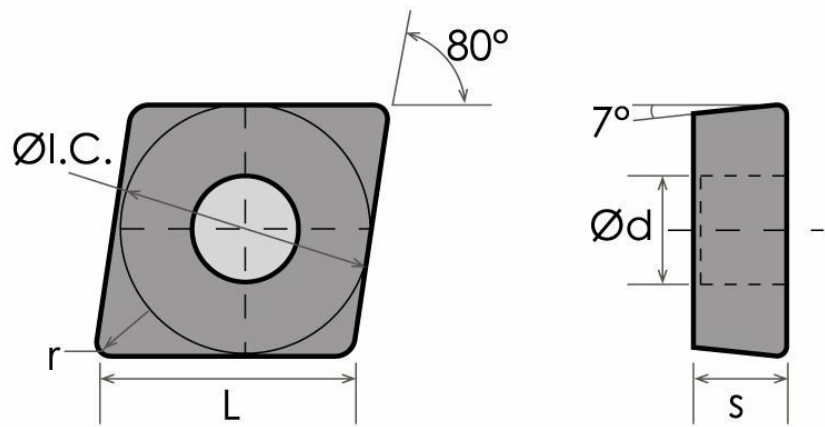


Figure 2.2: Technical drawing illustrating the dimensions and angles of a CPMT insert, including the inscribed circle (I.C.), length (L), thickness (S), and corner radius (R).



Figure 2.3: A section from a carbide insert selection chart, specifically highlighting the CPMT 80° Black-Diamond Coated Positive Rake Carbide Inserts. This chart helps in identifying the specific insert type and its general characteristics.

The CPMT insert features an 80° diamond shape, which is common for turning and facing operations. The C6 grade carbide material provides excellent wear resistance and toughness for general purpose machining of various materials.

3. SETUP & INSTALLATION

Proper installation of the carbide insert is crucial for optimal performance and tool life. Always ensure the tool holder is clean and free of debris before mounting the insert.

3.1 Tool Holder Compatibility

Ensure that the tool holder is compatible with CPMT style inserts. The insert's ISO designation (CPMT060204) provides specific details about its shape, size, and tolerance. Refer to the tool holder's specifications for proper matching.

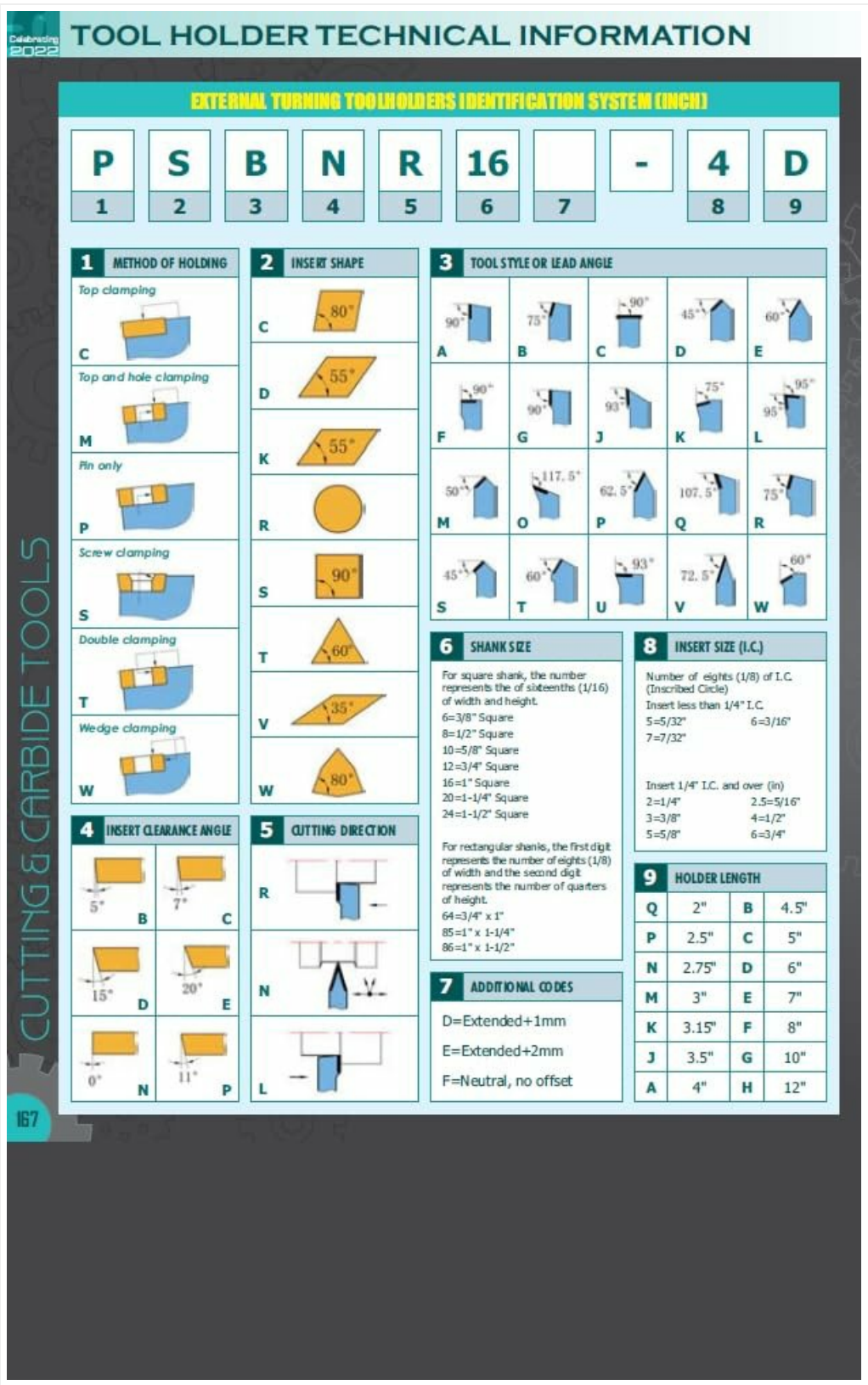


Figure 3.1: Technical information for external turning toolholders, illustrating various clamping methods, insert shapes, and designation systems. This helps in selecting the correct tool holder for the CPMT insert.

3.2 Insert Mounting Procedure

- Cleanliness:** Before installing, thoroughly clean the insert pocket of the tool holder to remove any chips, dust, or foreign particles. A clean seating surface ensures proper clamping and prevents premature insert failure.

- Positioning:** Place the CPMT insert into the tool holder pocket, ensuring it sits flush and correctly oriented. The 80° diamond shape should align with the pocket's geometry.
- Clamping:** Secure the insert using the appropriate clamping mechanism of your tool holder (e.g., screw, lever, or top clamp). Tighten the clamping screw to the manufacturer's recommended torque specifications. Overtightening can damage the insert or screw, while undertightening can lead to insert movement during machining.
- Inspection:** After clamping, visually inspect the insert to ensure it is securely seated and there is no gap between the insert and the tool holder pocket.

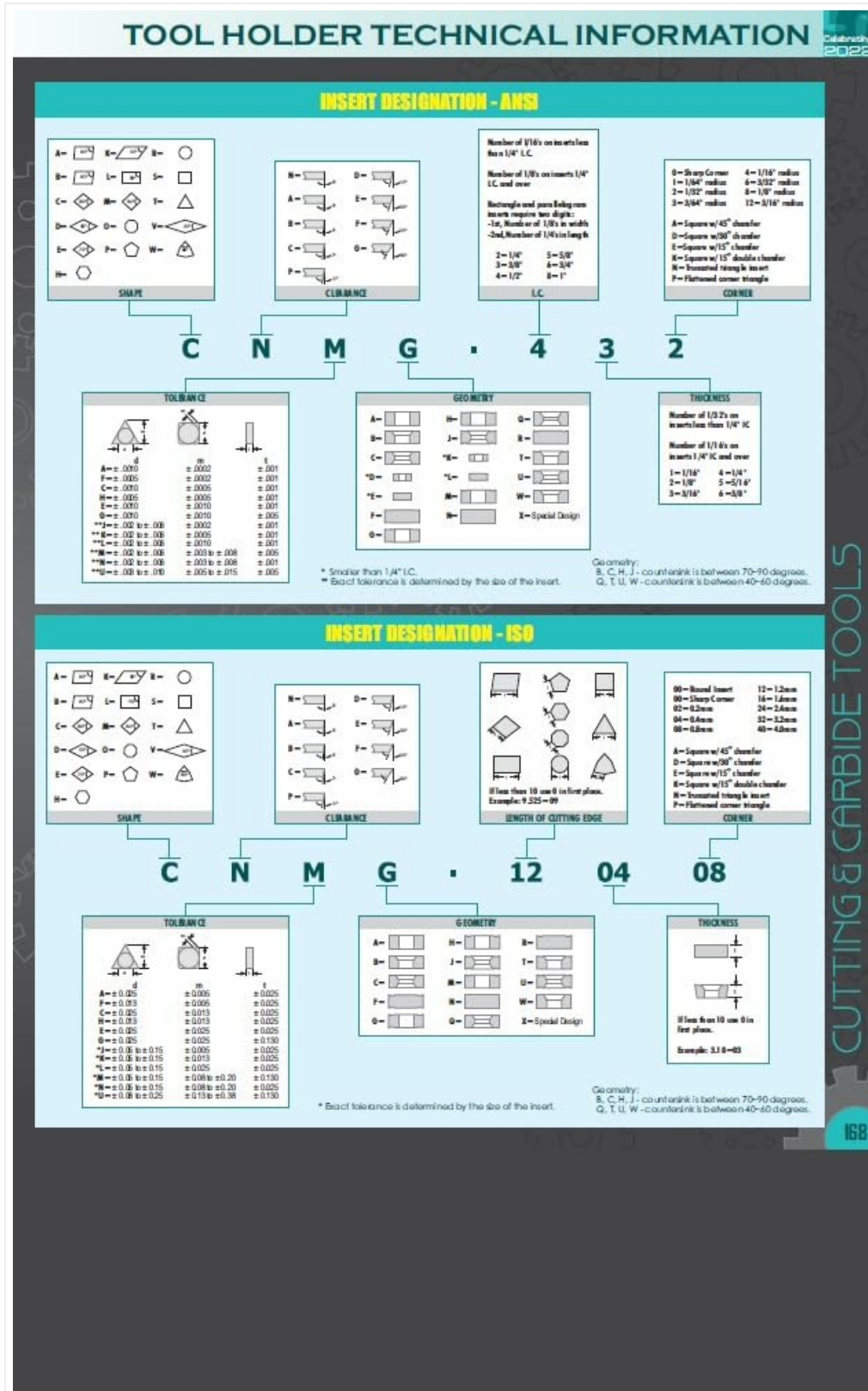


Figure 3.2: Detailed charts explaining ANSI and ISO insert designation systems. This information is vital for understanding the specific characteristics and compatibility of the CPMT060204 insert.

4. OPERATING INSTRUCTIONS

The HHIP CPMT C6 Carbide Inserts are versatile for various turning and finishing operations. Adhering to proper operating parameters will maximize tool life and achieve desired surface finishes.

4.1 General Machining Guidelines

- **Material Compatibility:** C6 grade carbide is suitable for general purpose machining of steel, cast iron, and some non-ferrous materials. Refer to grade comparison charts for specific material recommendations.
- **Cutting Parameters:** Optimize cutting speed, feed rate, and depth of cut based on the workpiece material, machine rigidity, and desired surface finish. Start with manufacturer-recommended parameters and adjust as needed.
- **Coolant Usage:** Use appropriate cutting fluid to dissipate heat, lubricate the cutting zone, and evacuate chips. This helps extend insert life and improve surface quality.
- **Chip Control:** The integrated chip breaker on the CPMT insert is designed to manage chip formation effectively, preventing long, tangled chips that can interfere with the machining process.

CARBIDE GRADE INFORMATION/COMPARISON

GRADE	MITSUBISHI	SANDVIK	SECO	KENNAMETAL	VALENITE	KORLOY	WALTER	TaeguTec
XAB849	UE6005/UE4010	GC4015	DX110	KC911Q/KC935			WTL41/WTA33	
XAB848	F7010	GC4015	DX110	KC901Q/KC910	SV305	NC310	WTA21	T1300
XAB749	UC601Q/BU4020	GC4020	P200	KC725M/KC9125	SV410		WTA31/WAX15/WQM25/WTE2	T1300
XAB748	UC6025/F620	GC4025	T230M/T25M	KC904Q/KC625M	SV325	NC310	WAP20/WTA43	
XAB699	UP20M/AP20M	GC4030/GC4035	CP20/P200	KC830/JCMK/C7025/KC7215	SV935	NC320/NC330	WXM15/WTA41	T17200
XAB698								
XAB649	UE6035	GC4125	CP30	C04/KC7020	SV330	NC320	WXP25/WTA61/WTL71/WTL14	
XAB599	UE6035	GC1120	TP40	CS3K/C7030	SM045	NC330	WQM35/WTP90	T18020
XAC849	UC601Q/BU4020	GC3015/GC3115	P100	KC625M/KC631M	SV305		WAK15	
XAF799	UP10H	GC1020/GC1120	DX100	KC992M/KC7215/KC9315/KC7225	SV415	NC315K	WAK20/WTA43/WTA33/WTA41	
XAF798	AP20M	GC3040	P25M	KC9025/KC631M		NCM325	WXP20/WTP20	
XAF797								
XAF960	AP15F	GC3040		CS3K/C7030	SV315		WAP35	T18020
XAL849		GC3015		KCS10M			WAM10/WAP10	T19030
XAL749	F620	GC2025	CP50	KC9225/KC7020	SV415	NC325	WAM20/WTA43	T15100
XAL748	F620	GC2025	CP50	KC9225/KC7020	SV415	NC325	WAM20/WTA43	T15100
XAL649	F730	GC2035	CP50	KC9040/KC7020		NCM335	WIP35/WTA51	T18020
XBF70R								
XMF849								

CHIP-BREAKER INFORMATION

Characteristics	Description
-DF	Recommended for finishing steel materials. With a satisfactory flow of chips and an excellent surface quality.
-DM	Recommended for semi-finishing steel materials. With a tight cutting force and a wide range of chipping, it can achieve better results in machining alloyed steel with a high adhesiveness.
-DR	Recommended for quasi-roughing steel materials. It is the first option for roughing operations under general working conditions. It can achieve a high rate of metal removal and economy.
-EF	Recommended for finishing materials heat-resistant steel. A specially designed rake angle and an inclined edge angle aimed at machining highly adhesive and plastic material hard to machine, like stainless steel. The edges are sharp making the cutting tight and smooth, getting a good control of the chips and obtaining an excellent surface quality, which makes it most suitable for ultra fine and fine machining of such materials.
-EM	Recommended for 300 series stainless steels. Impact resistance of the cutting edge is strengthened for interrupted cutting. The sharp cutting edges function to shear low machinability rated metals while resisting edge-build-up.
-HF	Recommended for finishing of universal applications. Suitable for finishing internal and peripheral operations in machining steel and cast iron. Fine finishing of surface can be achieved with a slow feed rate.
-HM	Recommended for semi-finishing of universal applications. With sharp wave cutting edges to reduce cutting force. Suitable for semi-finishing internal and peripheral operations of steel and cast iron. It is the first choice for semi-finishing of internal holes and allows chips to flow smoothly.
-HR	Recommended for roughing operations. With tough cutting edge. Suitable for internal and peripheral machining of steel, stainless steel and cast iron with irregular surface.
-LH	Recommended for aluminum alloy. Suitable machining aluminum alloy with larger cutting depth and higher feed rate.
-PF	Recommended for finishing steel materials. Suitable for finishing operations under unstable cutting conditions with a light cutting force.
-PM	Recommended for semi-finishing steel materials. With a stronger edge than -DM. Suitable for semi-finishing operations under unstable cutting conditions and for machining cast iron as well with a light cutting force.
-PR	Recommended for roughing of steel. With a high safety of cutting edges. It can achieve a high rate of metal removal with a low cutting force under working conditions of deep cuts and fast feed rates.

Figure 4.1: Chart detailing various chip-breaker geometries and their recommended applications. The CPMT insert features a specific chip-breaker designed for optimal chip control during turning and finishing.

4.2 Turning and Finishing Applications

The 80° diamond shape and 11° relief angle make these inserts ideal for a range of operations:

- **External Turning:** Suitable for general turning of external diameters.
- **Facing:** Effective for machining flat faces perpendicular to the workpiece axis.
- **Finishing:** The sharp cutting edge and precise geometry contribute to excellent surface finishes, especially when using appropriate feed rates and depths of cut.

5. MAINTENANCE

Proper maintenance extends the life of your carbide inserts and ensures consistent performance.

5.1 Cleaning and Storage

- **Cleaning:** After use, clean inserts to remove any adhering chips or coolant residue. Use a soft brush or compressed air. Avoid harsh chemicals that could damage the coating.
- **Storage:** Store inserts in their original packaging or in dedicated insert trays to prevent chipping or damage to the cutting edges. Keep them in a dry environment to prevent corrosion.

5.2 Inspection for Wear

Regularly inspect inserts for signs of wear or damage. Replace inserts when:

- **Flank Wear:** Excessive wear on the flank face behind the cutting edge.
- **Cratering:** Pitting or cratering on the rake face.
- **Chipping/Breakage:** Visible chips or fractures on the cutting edge.
- **Built-Up Edge (BUE):** Accumulation of workpiece material on the cutting edge, which can indicate incorrect cutting parameters or insufficient lubrication.

Timely replacement of worn inserts prevents damage to the workpiece, machine, and tool holder.

6. TROUBLESHOOTING

This section addresses common issues encountered during machining with carbide inserts and provides potential solutions.

Problem	Possible Cause	Solution
Poor Surface Finish	Incorrect feed rate or cutting speed.	Adjust cutting parameters.
	Worn or chipped insert.	Replace insert.
	Insufficient coolant.	Increase coolant flow or change type.
	Machine vibration.	Check machine rigidity and clamping.
Premature Insert Wear	Excessive cutting speed or feed rate.	Reduce cutting parameters.
	Incorrect grade for workpiece material.	Select a more appropriate insert grade.
	Lack of coolant.	Ensure adequate coolant supply.
	Vibration or unstable setup.	Improve setup rigidity.
Chip Control Issues	Incorrect feed rate or depth of cut.	Adjust feed rate and depth of cut.
	Chip breaker not suitable for application.	Consider a different insert with a more suitable chip breaker geometry if available.

7. SPECIFICATIONS

Detailed technical specifications for the HHIP CPMT C6 Carbide Insert (Model: 6060-0322).

Attribute	Value
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Attribute	Value
Brand	HHIP
Model Number	6060-0322
Material	Carbide (C6 Grade)
Insert Type	CPMT (80° Diamond)
ISO Insert Number	CPMT060204
Inscribed Circle (I.C.)	3/8 inch
Corner Radius (R)	0.0315 inch
Relief Angle	11°
Product Dimensions (L x W x H)	7.62 x 2.54 x 15.24 cm (3 x 1 x 6 inches)
Item Weight	22.5 grams
UPC	769053061924

CARBIDE INFORMATION	
GRADE COMPARISON	
C-2	General purpose-for cast iron and non-ferrous materials.
C-5	For heavy roughing to semi finishing of all steels.
C-6	Designed for heavy roughing to semi finishing of steels.
BPG253-CVD	CVD coated universal grade is suitable for steel and cast steel continuous cutting on interrupted cutting, finishing to roughing.
BPG20B-PVD	PVD coated micro-grain carbide to use for a variety of stainless steel finishing at medium to low cutting speed, excellent edge strength and high surface quality, provides the perfect ride cutting. High thermal shock resistance. Suitable for light interrupted cuts.
TiN Coated	For turning and milling carbon and alloy steels, tool steel and stainless steel. Provides longer life than uncoated grades. For high heat & wear resistance on alloys, stainless steel & ductile iron.
XAB599	CVD allround coated cemented carbide. Optimized for medium to rough steel milling, but also a good solution for nodular cast iron.
XAB649	A secure all around CVD coated grade for high productive P30 applications. It is tough enough for the most difficult steel machining. Use in dry and wet machining and interruptions. A grade you can rely on when the going gets tough.
XAB698	Possesses an excellent thermal and chemical stability with a optimized combination of high performance Nano-coating and a highly tough substrate of ultra fine grain aimed at materials hard to machine, such as stainless steel, heat resistant alloys, titanium alloy, high temperature alloys, etc. It is especially suitable for finishing and semi-finishing applications.
XAB699	CVD all round coated cemented carbide. Optimized for steel milling, but also a good solution for nodular cast iron. The grade provides an economic solution in medium to long series production.
XAB748	Comprising of thick TiCN and Al2O3 coating has high antiplastic yield and cutting edge strength and is the preferred universal grade from steel finishing to roughing. It behaves steady in wicked cutting conditions and can realize environmental dry-cutting. The cutting speed can increase more than 25% of the same cutting condition and the life will be improved more than 30% at the same cutting speed.
XAB749	The cutting edge has special strength and toughness. In an optimal combination with MT-TiCN, thick layer Al2O3/TiN coating. It is a suitable grade for a wide variety of applications. It is good for finishing, semi-finishing and light roughing of steel, cast steel, stainless steel and cast iron.
XAB848	Composed of thick TiCN and Al2O3 coatings makes it suitable for finishing and semi-finishing at high speed. It upgrades abrasive resistance greatly on the premise of increasing toughness. The cutting speed can increase more than 25% and the life will be improved more than 30% at the same cutting speed.
XAB849	Substrate with excellent wear-resistance. In combination with MT-TiCN, thick layer Al2O3/TiN coating. It is an ideal grade for finishing steel, cast steel and stainless steel under high speed and dry machining.
XAC849	CVD allround coated cemented carbide. Optimized for steel milling, but also a good solution for nodular cast iron. This grade provides good economy in medium to long series production.
XAC898	CVD coated grade, which is the combination of hard substrate and coating thick Al2O3 + thick TiCN, shows excellent wear resistance and impact resistance when machining nodular cast iron at high speed.
XAF795	Unique grade material with near perfect wear resistance and high temperature resistance. The no-TiAlN coating, ultrafine grain substrate, and unique surface treatment make this grade suitable for high precision cutting of "difficult to machine" materials, such as stainless steel, etc..
XAF798	A combination of 2.4 um no-TiAlN coating and ultrafine grain carbide substrate with high strength and toughness. Suitable for light to medium milling and boring of all kinds of materials. Recommended for finish and semi-finish turning of stainless steel and roughing turning of high-temperature alloys of steel from finishing to roughing. Under the same cutting conditions, the cutting speed can be increased by more than 25%, while the tool life can be 30% longer under the same cutting speed.
XAF799	PVD TiN coated carbide grade with good toughness and wear resistance. It is good for threading and drilling (both peripheral and central inserts) low carbon steel, stainless steel and heat resistance for steel and cast irons.
XAL649	Substrate with good toughness and strength. In combination with TiCN, thin layer Al2O3, TiN coating. It is a premium grade for semi-finishing to light roughing milling of stainless steel at continuous and intermittent milling conditions.
XAL749	A very all around CVD coated cemented carbide grade optimized for medium machining to roughing of stainless steel in both continuous and interrupted cuts. The grade has an excellent resistance to both thermal and mechanical shock.
XC899	With fine size grain. Good for fine and semi-finishing machining of cast iron and nonferrous metal. Particularly for machining of aluminum.
XMF849	TiCN based cermet with fine resistant thermoplastic transmutation and resistant built-up. It is suitable for semi-finishing and finishing of steel, stainless steel and cast iron.

Figure 7.1: A comprehensive chart comparing different carbide grades, their properties, and recommended applications. This helps in understanding the C6 grade's characteristics.

8. WARRANTY & SUPPORT

Information regarding product warranty and customer support is typically provided by the point of purchase or the manufacturer.

8.1 Warranty Information

Specific warranty terms for HHIP products, including carbide inserts, are subject to the policies of the authorized

distributor or retailer from whom the product was purchased. Please retain your proof of purchase for any warranty claims.

8.2 Customer Support

For technical assistance, product inquiries, or support regarding your HHIP CPMT C6 Carbide Inserts, please contact your supplier or the HHIP customer service department. Contact details can usually be found on the manufacturer's official website or through your product distributor.

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